NYE COUNTY NUCLEAR WASTE REPOSITORY PROJECT OFFICE

TECHNICAL PROCEDURE

TITLE:		Revision: 1
Runoff Sampler Construction, Field Sample Collection, and Handling of Surface Runoff Water Samples		Date: 2-24-09 Page: 1 of 17
TECHNICAL PROCEDURE NUMBER: **TP-11.1**	SUPERSEDES: **Revision 0, 11-20-08**	
APPROVAL 2-24-09 Director — Date	CONCURRENCE 2/24/09 Geoscience Manager — Date 2-24-09 Principal Investigator — Date 2/24/09 Quality Assurance Officer — Date	

1.0 PURPOSE

This technical procedure (TP) provides instructions for the construction and emplacement of runoff samplers; and field collection, field testing, laboratory data validation, documentation, and handling of surface runoff water samples, sediment samples, and precipitation water samples by the Nuclear Waste Repository Project Office (NWRPO). Implementation of this procedure ensures that these samples will be collected following industry-standard procedures, correctly identified, and the data derived from samples will be traceable back to the point of origination and sampling time. The user shall refer to the most current revision of all referenced NWRPO TPs, work plans (WPs), and Quality Administrative Procedures (QAPs).

2.0 SCOPE

This procedure includes activities required to collect, document, and maintain custody of surface runoff water, sediment, and precipitation water samples gathered for the NWRPO's Independent Scientific Investigations Program (ISIP).

2.1 Applicability

This procedure applies to the principal investigator (PI) and NWRPO field personnel performing construction and emplacement of samplers and collection, documentation, and packaging of surface runoff water samples, sediment samples, and precipitation water samples as specified in WP-11, *Groundwater and Surface Runoff Water Chemistry Sampling and Analysis*.

2.2 Training

NWRPO field personnel will be trained on this procedure before conducting work and will document that they have read and understand this procedure. Personnel performing collection and field analysis of surface runoff water samples, sediment samples, and precipitation water samples shall be scientists, engineers, or technicians with demonstrated field experience in performing these duties.

3.0 DEFINITIONS

3.1 Acceptable Materials – the sole materials allowed to contact surface runoff water samples, sediment samples, and precipitation water samples are dependent on the analytes being tested. Acceptable materials that may contact runoff water samples are stainless steel, glass, latex, nitrile, fluorocarbon resin (e.g., Teflon™, PTFE, FEP, or PFA), and plastics (e.g., PVC, polyethylene, polypropylene, or silicone tubing, and tygon™).

3.2 Negative-Pressure Pump – a negative-pressure pump (i.e., suction pump) is a device for removing surface water from a runoff sampling device. Peristaltic and centripetal pumps are common types of negative-pressure pumps.

3.3 Permissible Pumps – include sampling equipment that has minimal effect on water quality when used to obtain surface water samples from the RSD. The parts of permissible pumps that contact the water sample shall be comprised solely of acceptable materials. The use of permissible pumps is dependent upon the analyses to be conducted on the acquired samples.

3.4 Rain Gauge – instrument used to gather and measure the amount of liquid precipitation (as opposed to solid precipitation that is measured by a snow gauge) over a set period of time.

3.5 Runoff Sampling Device (RSD) – a device to collect water from surface runoff events.

3.6 Runoff Sampling Device Storage Volume – the total volume of water present within the Runoff Sampling Device prior to sampling.

3.7 Runoff Water Sample – water acquired from a RSD for chemical analyses that is meant to be representative of infiltrated precipitation and precipitation runoff within an arroyo.

3.8 Sample Bottles – containers made of acceptable materials specifically designed and prepared for storing liquid or sediment samples. Sample bottle type, size, and added preservative are specific for particular analytes.

3.9 Sediment Sample – sample of in situ sediments at surface runoff sampler emplacement location, collected prior to emplacement of the sampler.

3.10 Wet Precipitation Sampler – sampling device designed with a removable cover to be used during precipitation events in order to capture wet precipitation and exclude dry-fall such as dust that would enter an uncovered sampler between precipitation events.

4.0 RESPONSIBILITIES

The PI or designee is responsible for the preparation of this procedure, preparation of test plans and/or WPs that specify RSDs to be sampled and analytes to be tested, validation of data from the testing laboratory, and technical oversight to ensure compliance with this procedure and applicable plans.

The NWRPO Geoscience Manager (GSM) or designee is responsible for ensuring that applicable Quality Assurance (QA) WPs and procedures are in place prior to beginning an episode of water sample collection and analysis.

NWRPO field personnel are responsible for implementing this procedure in the field. Tasks conducted by NWRPO field personnel include sampler construction, sample collection, sample custody in the field, field testing, and completion of field data sheets, sample shipment, and delivery of data to the NWRPO QA Records Center.

5.0 PROCESS

This technical procedure controls the construction and emplacement of surface runoff samplers in addition to the collection, field testing, and handling of precipitation and surface runoff water samples, sediment samples, and precipitation water samples from the time the samples are gathered at the location until they are ready to be sent to the laboratory for chemical analyses. A Transfer-of-Custody Form (Attachment A) will be used to document the transfer of samples from the collector in the field to the testing laboratory. Alternatively, a chain-of-custody form developed by the testing laboratory may be used to document transfer of samples. In addition, this procedure describes the use of QA samples to validate laboratory testing data.

Procedures will be performed in sequential order; any deviation and rationale for changes in methods will be recorded in applicable field scientific notebooks. Field scientific notebooks and forms associated with this procedure will be used to document performance of the tasks in this procedure. Field notebooks will meet the requirements of QAP-3.2, *Documentation of Scientific Investigations*.

5.1 Construction of Surface Runoff Samplers

5.1.1 Materials

Table 1
Construction and Installation Materials

Item
2.5-gallon plastic buckets
Sand paper
$^{1}/_{4}$-inch outside diameter (OD) silicone tubing
Zip ties
Drill
drill bits
T-post
Spray paint
Deionized (DI) water (<0.06 mS/cm conductivity)
Epoxy adhesive e.g. Super Glue Corp – Quick Setting Gel Epoxy
Distilled bottled water (<0.01 mS/cm conductivity)
5-gallon buckets (One must be graduated)
Silica sand (8/12-mesh)
600 ml beaker
Electrical conductivity meter
HDPE bottles, 2-liter size
Sieve (ASTM #4)
Wet precipitation sampler
Rain gauges
Bailing Wire

5.1.2 Construction Procedure

1. Cut 5 feet of $^{1}/_{4}$-inch OD tubing.
2. Sand the bottom of the bucket and the tubing to improve adhesion.
3. Drill a single $^{1}/_{4}$-inch hole approximately $^{3}/_{4}$ inches from top of the bucket, as shown in Figure 1b and thread the tube through the hole. Place the hole as high on the bucket as feasible to maximize sample volume.
4. While wearing nitrile gloves or equivalent to prevent contamination, glue one end of the $^{1}/_{4}$-inch OD tubing to the bottom of the bucket with the epoxy adhesive (as shown in Figure 1b) and let it cure.
5. Epoxy the hole for a snug fit.

6. Soak the completed device in tap water for 24 hours to leach potential contaminants from the materials.

7. Rinse the completed sampling device with distilled water.

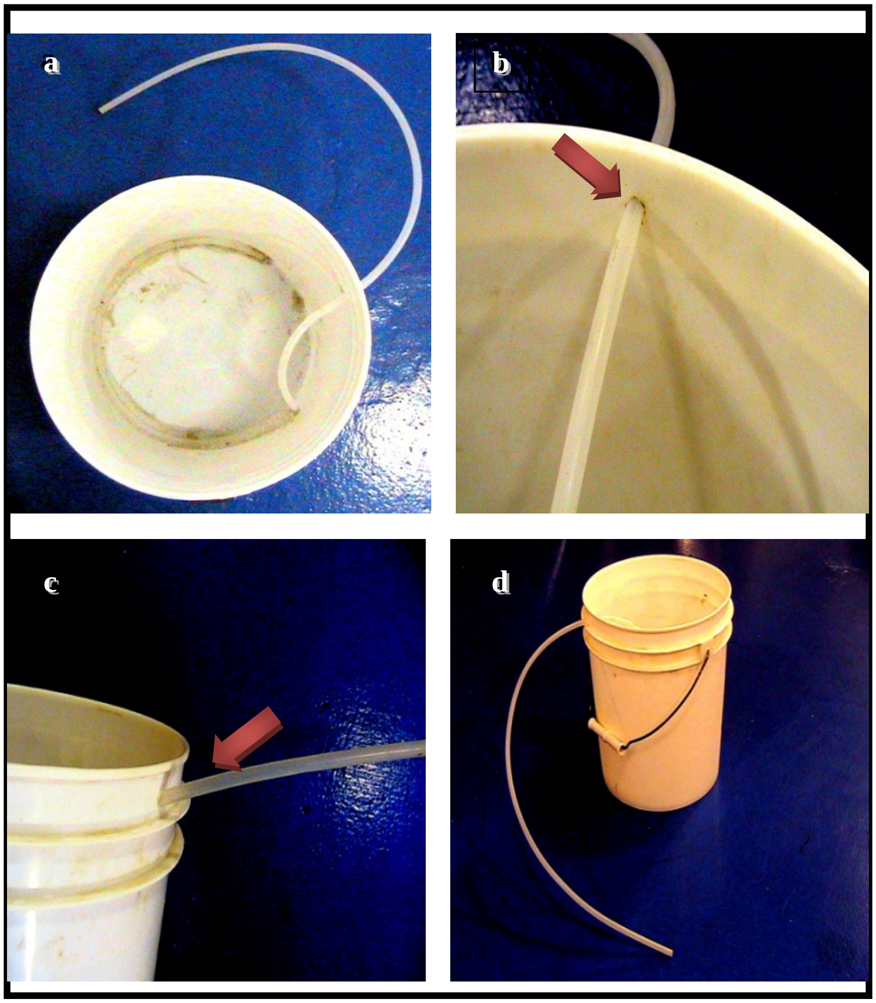

Figure 1. Photographic sequence of RSD construction
a. Shows the $^1/_4$-inch OD polyethylene tubing glued to the bottom of the bucket, **b**. and **c**. show the tube exiting the device, and **d**. shows the finished device.

5.1.3 Washing of Sand for Use in Backfilling Samplers

1. With a $^1/_{16}$-inch bit, drill a mesh of holes in the bottom of the bucket. (Figure 2b)

2. Fill the bucket with 2.5 gallons of sand.

3. Fill the graduated bucket with deionized or distilled water (5 gallons) as available.

4. Pour the five gallons of deionized or distilled water into the top of the meshed bucket.

5. Wait until the water finishes draining (~ 5 minutes).

6. Pour 1 gallon of distilled water into the sand-filled bucket and allow to drain.

7. Collect 10 ml of the residual rinsed water draining from the bottom of the sand-filled bucket and measure its conductivity with a conductivity meter calibrated according to manufacturer's instructions.

8. The conductivity of the last rinse outflow should be less than 0.1 mS/cm. If the conductivity of the out flowing water is greater than 0.1 mS/cm, add an additional one gallon of distilled water to the system until the outflow is below the threshold. Assign a number to the bucket containing the washed sand. Record the conductivity of the rinse water in the scientific notebook along with the number of the washed sand bucket.

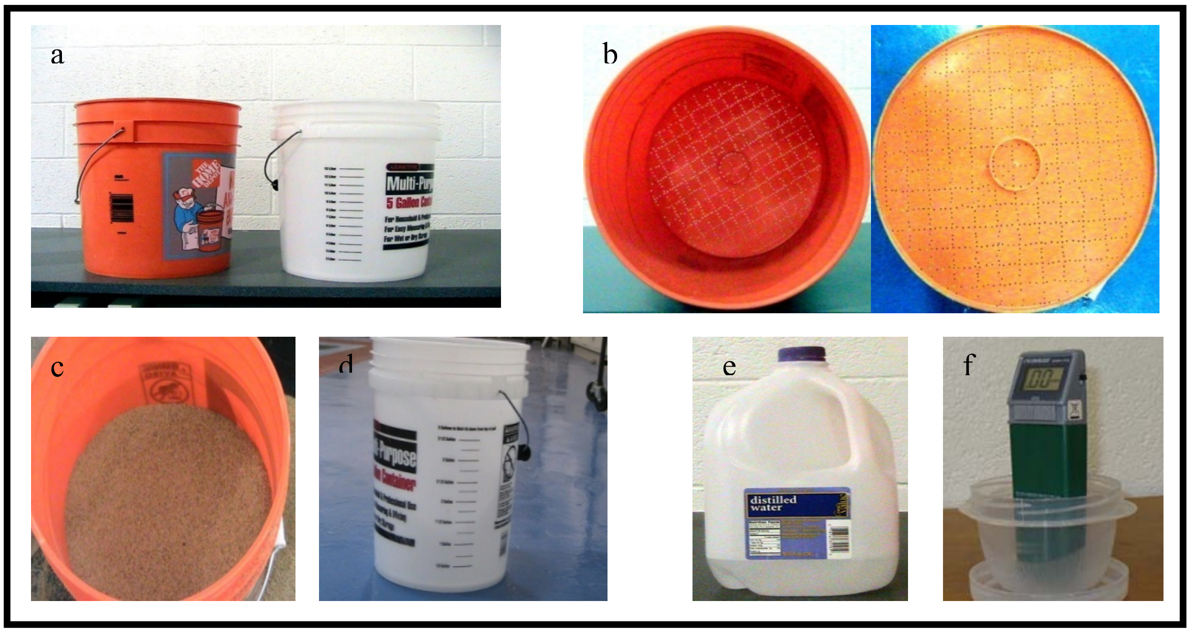

Figure 2. Photographic sequence of the washing sand protocol
a. Two five gallons buckets are needed; bucket #2 is graduated to 5 gallons. **b.** With a $^{1}/_{16}$–inch bit, drill a 1-inch by 1-inch mesh of holes in bucket #1. **c.** Fill the meshed bucket with 2.5 gallons of the sand. **d.** Fill bucket #2 with 5 gallons of DI or distilled water and pour water over the sand in bucket #1. **e.** Finally, pour 1 gallon of distilled water and wait until the system drains completely. **f.** Collect 10ml of the residual rinsed water and measure the conductivity (the conductivity of the last rinse outflow should be <0.1 mS/cm).

5.2 Field Emplacement of Surface Runoff Samplers and Initial Sediment Sample Collection

Sampling locations selected will be documented in the appropriate scientific notebook. Each arroyo selected as a sampling location will have two samplers a) one filled with washed sand and b) a second sampler filled with alluvial material (sand and silt) from the arroyo. The devices are to be placed at locations in surface runoff channels where water is likely to pool and where sufficient depth of sediment facilitates digging a hole for emplacement. The samplers should be placed in a low gradient (depositional) portion of the arroyo to the extent possible to prevent washing out during storms. At all sites selected by the PI, rain gauges shall be installed to provide a quantitative measure of the amount of precipitation received at the site.

The emplacement procedure for both washed sand filled samplers and alluvial material filled samplers is the same with a few exceptions detailed in the following.

1. Upon selection of a site for each runoff sampler, collect approximately 3 liters of alluvial materials in a test bucket. Pass these materials through a No. 4 (4.75 mm) sieve, and collect 2 liters of the sieved material in wide-mouth HDPE bottles (i.e., in one 2-liter bottle or two 1-liter bottles).

2. Dig a hole at the selected location within the arroyo, placing the excavated dirt down gradient of the hole. Visually determine the depth to initial moisture, if any, and record the depth in the scientific notebook.

3. Use an additional test bucket, the same size as the sampler bucket, to test the depth of the hole. Emplace the bucket in the hole and test the depth by moving a straight edge laid on the surrounding undisturbed surface over the top of the sampler. For an ideal fit, the top of the sampler should be 1-2 inches below the undisturbed surface of the arroyo.

4. When an adequate depth has been reached, remove the test bucket and level the earth beneath it to provide a stable base, then again emplace the bucket to ensure the top of the sampler is 1-2 inches below the undisturbed surface of the arroyo.

5. The upper end of the sampling tube should be sealed with a plug. Wearing latex gloves remove the test bucket and place the sampler in the hole. This is intended to avoid contaminating the sampler with sweat.

6. Follow 6a for the washed sand sampler and 6b for the alluvial material sampler. Before emplacing the samplers put a unique ID (e.g. barcode) on each bucket.

   6a. Fill the sampler with the 8/12 washed sand ensuring that the upper end of the sampler tube is not buried. Place the lid on the top of the sampler and check depth and level again using a hand level. Adjust as necessary. Emplace the bucket such that the sampler tubing exits the bucket down gradient. Backfill around the sampler with the previously removed alluvial material to within three inches of the top. Wrap the excess sampler tubing around the bucket and place a plug in the end of the tubing. Remove the lid of the sampler. Backfill the remaining three inches with the 8/12 washed sand, bringing the area back up to grade with the undisturbed arroyo surface. Insure that the tube is underneath the washed sand surface to prevent sun (UV) damage.

   6b. Place the sampler for the alluvial material at least six feet down gradient of the washed sand sampler, or as field conditions warrant. If the arroyo width is 15 feet or wider, the 8/12 washed sand and alluvial samplers may be placed cross gradient. Add approximately ½ liter of 8/12 washed sand at the sampler tubing intake to create a filter pack. Record the number of the washed sand bucket from which the washed sand was taken in the scientific notebook. Fill the sampler with the alluvial material. Emplace the bucket such that the sampler tubing exits the bucket down gradient. Backfill the bucket and bucket sides with alluvial material around the sampler to within three inches of the top Wrap the excess sampler tubing around the bucket and place a plug in the end of the tubing. Backfill the remaining three inches with alluvial material, bringing the area back up to grade with the undisturbed arroyo surface. Carefully place natural alluvium on top of the 8/12 sand without disruption to the surrounding material. Insure that the tube is underneath the alluvial surface to prevent sun (UV) damage.

7. Take a T-post and pound it into the alluvium.

8. Spray paint the top of the T-post and mark it with tape or other visibility-enhancing cap.

9. Mount a rain gauge ≥1 inch above the top of the T-post, and positioned such that a tape can be stretched from the top of the T-post to both sampler locations.

10. As time permits, record the coordinates of the sampler location with the GPS and the measured distance and direction from the T-post to the samplers in the scientific notebook. Note: approximate GPS locations have been determined prior to installation. Due to time constraints initial GPS location for the T-posts and samplers will be determined using a hand held GPS unit and later refined by using aTrimble® GeoXH unit that has greater accuracy.

11. Place a temporary placard containing the site ID near the T-post and take a photograph for identification purposes.

5.3 Collection and Handling of Water Samples and Sediment Samples

5.3.1 Overview

Water samples and sediment samples shall be collected at locations and in quantities and types as directed by the PI and project WPs. Water levels from the rain gauge shall be measured and recorded along with rainfall amounts from other meteorology stations in the region and documented in the scientific notebook.

Water samples from all RSDs shall then be extracted with a negative pressure pump and placed in appropriate sample containers for laboratory analysis. All non-dedicated sampling and measurement equipment shall be decontaminated before each use with distilled water, where reasonably possible. Sample bottles for different analytes shall be the appropriate type and size and contain the appropriate preservative as summarized in Table 2. Sample filtering requirements are also summarized in Table 2. Table 2 may be revised by the PI or designee for specific sampling sessions as needed.

All samples shall be appropriately labeled and sealed and chains of custody shall be maintained and recorded on the Transfer of Custody Form (Attachment A) or the testing laboratory equivalent of this form and also on the Sample collection, Storage, and Shipping Information Form (Attachment B). A field scientific notebook shall be used to document sampling activities, field measurements, and sample collection at each sampling location. All variations from established procedures shall be approved by the PI and documented in the scientific notebook. All known sources of contamination of samples should be documented in the scientific notebook.

Sample results shall be evaluated to determine compliance with QA objectives, identify potential field and laboratory sources of error, and assign data qualifiers to original sample data if QA objectives are not met.

A precipitation water sample shall also be collected, if available, to provide a measure of the initial chemical composition of the precipitation. A wet-only precipitation sampler will be placed at a location central to the sampling area. If financial considerations permit, the sampler will be co-located with a meteorological station. The sampler will have a minimum area of 1,000 cm^2 in order to provide a one liter or more sample volume during a one cm storm event.

5.3.2 Runoff Water Sampling

The sampling session includes all the RSDs in the area specified by the PI. Samples will be collected from each of the devices for the laboratory analyses listed in Table 2 in the order listed under the priority column. Sample volume will be limited and may not support all the potential analyses listed in Table 2.

Subsequent to arrival at each location remove the plug from the tube, and attach to the peristaltic pump, ensuring that the direction of flow is from bottom to top. Always check to make sure that sand has not built up on the tube impeding the flow to the pump. Purge the first 10 ml of sample water exiting the pump. After purging is complete collect the requested water samples in the specified order. Sample order is prioritized in Table 2 in consideration of limited sample volume available. If sufficient volume is not obtained to appropriately fill any given sample, the laboratory and/or GSM should be contacted to ascertain if the partial sample can be analyzed or must be discarded.

After sampling is completed, purge the remaining water from the Runoff Sampling Device to provide space for collection of the next runoff event.

5.3.3 Field QA Samples

If directed by the PI and/or applicable WP, prepare a set of field blanks in the field from reagent-grade water supplied from selected laboratories. The reagent-grade water shall be shipped to and from the field with other samples. These samples provide a test of contamination from atmospheric contaminant sources (e.g. dust) as well as from bottle preparation and preservatives, storage, shipping, and analyses.

5.3.4 Precipitation Samples

Samples will be collected from the wet precipitation sampler for laboratory analyses 1, 2, and 3 (listed in Table 2 in the order listed under the priority column). Sample volume will be limited and may not support all the potential analyses.

To collect the precipitation sample, empty the water from the sampler into a pre-cleaned container. Use a peristaltic pump to fill sample bottles as specified in Table 2. If sufficient volume is not obtained to appropriately fill any given sample the laboratory should be contacted to ascertain if the partial sample can be analyzed or must be discarded.

5.3.5 Sediment Samples

Perform a sieve analyzes according to ASTM D 422-63 (98). Determine initial water content by ASTM D 2216-98. Obtain soil extract following ASTM D 4542-95, using 2 kg of sediment with 3 liters of water. Filter and prepare samples according to Section 5.3.6. Obtain only priorities 1, 2 and 3 from Table 2.

5.3.6 Filtering, Bottling, Labeling, Preserving, and Shipping Water Samples

Table 2 summarizes typical container, filtering, and preservation requirements for a number of different analytes. These requirements may differ slightly between testing labs and sampling sessions. Some labs provide sample bottles that already contain the preservative. If these requirements differ from Table 2, the PI shall communicate these requirements to field personnel prior to each sampling and analysis episode. Further details regarding these requirements as well as labeling and shipping procedures are described in the following sections. The Sampling, Collection, and Storage Information Form (Attachment B) should be filled out in the field according to the specifics of the sampling sessions, and transmitted to the NWRPO Quality Assurance Records Center (QARC).

When filling sample bottles, note sources of contamination and minimize these sources when possible. Change gloves after taking priority 3 samples. Do not pre-rinse sample containers with the sample as the volume of sample available is limited. All sampling bottles should be clean prior to use. Rinse sample bottles with distilled water then shake the remaining distilled water from the bottles when done rinsing. Fill bottles to the required level, and add preservatives when required, ensuring that all preservative is added.

5.3.6.1 Method for Filtering Samples

Prior to collecting samples requiring filtering from each sampling location, install a new, large-capacity 0.45 micron filter on the discharge end of the tubing.

a) Ensure that at least 10 ml of the sample fluid pass through each new tubing/filter combination before collecting samples. Then install 0.45 micron filter if required.

b) Use a new filter for each RSD (one for each bucket).

5.3.6.2 Labeling Samples

If possible, pre-label bottles using pre-printed labels or indelible pen before collecting water samples. Complete labeling consists of writing directly on the glass or plastic bottle or a water-proof label with an indelible (permanent) “Sharpie®” type marker with the following information. Also note this information in the field scientific notebook.

a) Time

b) Date

c) Location (e.g. device 1)

d) Collector's initials

e) Indication of analysis (such as ^{3}H for tritium, Cl for chloride anion, etc.)

f) A sample number consisting of three letters ("RWS" indicating runoff water sample "SS" indicating sediment sample and "PWS" indication precipitation water sample) and four numbers. For example, RWS0001 refers to surface runoff sample number one. Each sample shall be numbered consecutively in order of date and time collected. The same number shall be assigned to all samples collected at the same date, time, and location.

5.3.6.3 Storing and Shipping Samples

In the field, minimize the exposure of samples to heat and direct sunlight, and transport samples to the NWRPO at the end of each sampling day. When possible, store samples in the field in coolers with ice packs. At the NWRPO, samples should be stored as specified by the analytical laboratory.

Carefully wrap glass bottles in bubble wrap (or equivalent) to prevent breakage during shipping. Ship all samples to the appropriate testing laboratory within 2 days of sampling in boxes or coolers with NWRPO Transfer of Custody (or laboratory chain of custody) Forms and any other forms required by the lab. Place all samples in the boxes or coolers with the caps up; do not place them on their sides. Pad the sides of the box or cooler with bubble wrap and pack samples so that they are held snugly in place. Use additional bubble wrap to prevent the samples from moving during shipping; pack the top of the box or cooler with bubble wrap so that samples cannot move vertically. If specified by the laboratory, pack all refrigerated and frozen samples with blue ice or some form of cold pack. If possible, pack all refrigerated and frozen samples together to ensure a longer cold period. Do not use free ice in the coolers; the water from melted ice can wash labels off, contaminate samples, and remove labeling tape. Ensure that boxes or coolers are securely closed and will not open during shipping. If boxes are used, label box sides with arrows pointing upward (toward the top of the box) and clearly label "THIS SIDE UP."

To minimize the chance of contamination if a bottle breaks open, place samples with added preservatives into separate containers, to the extent reasonably possible. Ship all samples by overnight carrier (i.e., Federal Express). Do not ship samples on Friday.

Table 2
Sample collection in order of priority

Priority	Sample Type	Filters (Yes/No)	Fill Level	Bottle Size (ml)	Bottle Type	Bottles Per sample	Preserve with NaOH (Yes/No)	Preserve with HNO_3 (Yes/No)
1	Alkalinity, TDS, conductivity	No	Fill just over half way	500	HDPE	1	No	No
2	Anions, cations, and nutrients	Yes	All the way to the top	250	HDPE	1	No	No
3	Metals	Yes	Fill just over half way	125	HDPE	1	No	Yes
4	Stable Isotope Ratio Analysis of Oxygen and Hydrogen in water	No	Fill just under half way	125	HDPE	1	No	No
5	Tritium	No	All the way to the top	125	Amber Glass	1	No	No
6	Stable Isotope Ratio Analysis of Carbon in total dissolved inorganic carbon; Radiocarbon (C-14)	No	All the way to the top (leave room for preservative)	1,000	HDPE	1	Yes	No

Note: Sample bottles shall be of the appropriate size/type and contain preservatives as specified by the analytical laboratory.

5.4 CHAIN OF CUSTODY

1. Maintain water samples and sediment samples under chain-of-custody control at all times. The samples must be in view of the current holder or secured in locked storage.

2. Ensure that all samples sent to testing laboratories are accompanied by a completed NWRPO Transfer of Custody Form (Attachment A) or a laboratory-generated equivalent as well as Attachment B.

3. Each time a sample is transferred, submit a copy of the form to the NWRPO QA Records Center.

5.5 QUALITY ASSURANCE SAMPLES AND DATA VALIDATION

Potential field sampling and laboratory analytical error shall be estimated from an evaluation of both field and laboratory QA samples (Taylor, 1987). The field QA samples and types and sources of error are discussed below. Individual laboratories have their own QA procedures and the results of their additional QA analyses are included with their laboratory analytical reports.

Data validation shall consist of an evaluation by the PI (or designee) of the degree to which QA objectives (Table 3) are met. The results of this data validation will become part of the quality assurance records database of Nye County NWRPO.

Field blanks shall be prepared and analyzed at a rate of 1 set per 10 sets of surface runoff water or sediment samples collected or at least 1 set per sampling session if fewer than 10 sets of runoff or sediment samples are collected. NWRPO field personnel will determine the locations where field blanks are to be prepared. Field blanks of reagent-grade water will provide an indication of contamination from field sampling, handling, and shipping processes.

Duplicate sediment samples shall be taken at every five sites.

Collection of field blanks and duplicate samples shall be documented in the scientific notebook.

6.0 DATA ACQUISITION METHODOLOGY AND LIMITATIONS

Runoff water, sediment and precipitation sampling and chemical analysis data may be used at U.S. Nuclear Regulatory Commission proceedings to evaluate the U.S. Department of Energy (DOE) license application. Detailed sampling-related data will be recorded in the field scientific notebook by NWRPO field personnel.

Hard and electronic versions of analytical reports from designated labs will be submitted to the NWRPO QARC for capture and preservation in the project files. Copies of the applicable pages of the field scientific notebook will be submitted with the analytical reports. The notebook will be submitted to the QA Records Center when it is filled, at the end of the contract, or at the end of the project, at the discretion of the Geoscience Manager or designee.

Possible data limitations include but are not limited to potential field sampling and laboratory analytical error. Data validation will be performed and documented as stated in section 5.5.

Table 3
Quality Assurance Sample Summary and Objectives

Quality Assurance Error Parameter	Quality Assurance Sample Type	Primary Source of Error	Quality Assurance Objective
Precision	Laboratory matrix duplicate	Laboratory analyses	D_1 and D_2 > 5 RL, RPD < 20%, D_1 or $D_2 \leq 5$ RL, $\lvert D_1 - D_2\rvert \leq 2$RL
	Matrix spike duplicate	Laboratory analyses	D_1 and D_2 > 5 RL, RPD < 30%, D_1 or $D_2 \leq 5$ RL, $\lvert D_1 - D_2\rvert \leq 3$RL
Accuracy	Matrix spike	Laboratory analyses	%R = 75 to 125
Cross-contamination	Methods blank	Laboratory equipment	< Laboratory reporting limit
	Field blank	Atmosphere, laboratory equipment, bottles, preservatives, storage, shipping, etc.	< Laboratory reporting limit

NOTES:
D_1, D_2 = Duplicate samples.
RL = Laboratory reporting limit.
RPD = Relative percent difference.
%R = Percent recovery.

7.0 REFERENCES

ASTM D 422-63(1998), "Standard Test Method for Particle-Size Analysis of Soils," ASTM International, West Conshohocken, Pennsylvania, www.astm.org.

ASTM D 2216-98 Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass.

ASTM D 4542-95 Standard Test Method for Pore Water Extraction and Determination of the Soluble Salt Content of Soils by Refractometer.

QAP-3.2, *Documentation of Scientific Investigations.* Quality Administrative Procedure. Nye County Nuclear Waste Repository Project Office (NWRPO). Pahrump, Nevada.

QAP-12.1, *Control of Measuring and Test Equipment.*

Taylor, J.K. 1987. *Quality Assurance of Chemical Measurements.* Lewis Publishers, Inc., Chelsea, Michigan.

WP-11. *Groundwater and Surface Runoff Water Chemistry Sampling and Analysis*. Work Plan. Nye County NWRPO. Pahrump, Nevada.

8.0 RECORDS

Field Scientific Notebook

Laboratory Analytical Reports (hard copy and electronic version)

NWRPO Transfer of Custody Form or chemical testing laboratory equivalent.

Sample Collection, Storage, and Shipping Information Form

9.0 ATTACHMENTS

A: NWRPO Transfer of Custody Form

B: Sample Collection, Storage, and Shipping Information Form

Attachment A
Transfer of Custody Form

Nye County Nuclear Waste Repository Project Office Form TP 11.1-1 Rev 0

Water Sample Transfer of Custody Form 11-20-08

Sample Number	Well Name or Location	Date Collected	Date Shipped	Analysis	Number of Containers

Lab Name:	
Recipient:	
Telephone	
Address	

Person Accepting Custody: ____________________

Date/Time: ____________________

Recipient: Please acknowledge receipt of this shipment and return completed within 10 working days to:
Nye County Nuclear Waste Repository Project Office
Quality Assurance Records Center (QARC)
1210 E. Basin Road, Suite 6
Pahrump, NV 89060
775-727-7727

Person Releasing Custody for Nye County : ____________________

Date/Time: ____________________

Checked By ____________________ Date: ____________________

Attachment B
Sample Collection, Storage, and Shipping Information Form

Analyte Priority	Sample Type	Filter (Yes/No)	Fill Level	Preservative	Bottle Type	Bottle Size	Type of Storage	Laboratory	Special Shipping Instructions
									Form TP 11.1-2 Rev 1 2-24-09